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BIOLOGICAL AND MICROSCOPICAL DEPARTMENT

OF THE

ACADEMY OF NATURAL SCIENCES.

January 4th.

Mr. J. D. Sergeant in the Chair.

Twenty-one members present.

Dr. McQuillen remarked that, in conjunction with Mr. Walmsley, he had made some attempts to mount blood corpuscles in such way as should maintain their natural shape. In solutions of glycerine and water, the form of the corpuscle of the frog had rapidly altered, but Mr. Walmsley had mounted some in glycerine jelly which remained unaltered up to date.

Dr. Tyson stated that to expect success with the aqueous preservative fluids was scarcely reasonable, unless a menstruum were used identical in its specific gravity with the liquor sanguinis of the blood. Such a solution can be obtained with glycerine and distilled water, in the proportion about f℥ij of Bourn's glycerine to f℥iiss of distilled water, and if one part of carbolic acid be added to 100 parts of the mixture, a suitable preservative fluid is obtained for many animal tissues.

January 18th.

Director S. W. Mitchell, M. D., in the Chair.

Twenty-four members present.

Dr. Wood exhibited to the department four species of the genus Sirosiphon, all of which he stated to be new to North America, and three entirely undescribed. One of them had been found growing on the face of a wet rock on the banks of the Wissahicon, by Dr. J. Gibbons Hunt, from whom he had received specimens. These are referable to *Sirosiphon pulvinatus* of Europe.

Two of the new species were collected in South Carolina, by Prof. H. W. Ravenel, who sent them to Dr. Billings, U. S. A., to whom Dr. W. stated he was indebted for the specimens. The following are the descriptions :

S. lignicola.—S. strato expanso, tomentoso, atro ; trichomatibus ramosissimis, arcte intertextis ; ramulis abbreviatis vel elongatis, subrectis aut varie curvatis, apice obtuso rotundatis vel subacuminatis ; trichomatum et ramulorum cellulis internis uni-biseriatis, plerumque pachydermaticis, dilute vel saturate ærugineis, enormibus, plerumque homogeneis terminalibus elongatis, cylindricis, sæpius nonnihil oscillarium modo articulatis, granulosis; vaginis sat amplis, haud achrois, vel luteo brunneo, vel fuscentibus vel ferrugineis.

Diam. Trich. C. V. max $\frac{1}{1500}''$

For the second species the specific name of *guttula* was proposed, from its habit of forming little drop like dots on the bark on which it grows. The following is the specific description.

S. phloiophilum, in maculis subnigris, parvi , tenuibus, plerumque rotundatis, interdum enormibus, dispositum; trichomatibus arcte intertextis, ramossimis, rigidis, inæqualibus, subcylindricis, nonnihil contortis; ramulis abbreviatis vel nonnihil elongatis, apice obtuse rotundatis; ramulorum et trichomatum cellulis tri-multiseriatis, plerumque pachydermaticis, ferrugineo-fuscis, enormiter globosis, homogeneis; cellulis apiculibus interdum breve cylindricis, haud articulatis; vaginis sat amplis, luteo-brunneis vel dilute ferrugineo-brunneis.

Diam. Max. trich. cum. vag. $\frac{1}{750}''$

The other new species had been found growing in some stagnant water, with a number of other algæ, in New Jersey. The filaments were widely separated and were so large as to be visible to the naked eye. The following is the specific description:

Sirosiphon disjunctum.—S. trichomatis subsolitariis, longis usque ad lineas quatuor, cylindricis, ramossis; ramulis singulis; cytioplasmate interdum ærugineo, plerumque aureo-brunneo, in ramulorum apice interdum nullis sed plerumque in cylindricis longis oscillarium nonnihil modo articulatis; cellulis internis uniseriatis, rare biseriatis, subglobosis, interdum sejunctis, plerumque arcte connectis et moniliformibus, modo confluentibus, haud pachydermaticis; cellulis interstitialibus nullis; vaginis achroois, interdum brunneis.

Diam. Trich. cum vag. $\frac{1}{570}''$; sine vag. $\frac{1}{1000}''$

Mr. W. H. Walmsley exhibited a slide showing an unrecognised larva which he found infesting the potato, and which he believes to be a cause of the potato rot, so common in the potatoes at present in the market.

Dr. McQuillen exhibited specimens of *Trichina spiralis*, from a patient recently dead of phthisis pulmonalis, at the Philadelphia Hospital. They were detected by Dr. Hough, a resident physician at the Hospital. No symptoms indicating their presence were noted previous to death.

February 1st.

Director S. W. Mitchell, M. D., in the Chair.

Nineteen members present.

Dr. H. C. Wood exhibited to the section what he believed to be a new genus of fresh water algæ. He found the plant floating upon the Schuylkill River. It consists of a subglobular, bright green, firm, gelatinous thallus, the outer portions of which are so condensed as to give the appearance of a periderm, although there is no real periderm present. The trichomata or filaments radiate from the inner part of the frond towards the outer surface, but many of them have their origin in the outer parts of the thallus. They are branched, and are remarkable for the fact, that they are furnished with large globular heterocysts raised on short branches. No distinct sheaths were visible ; everywhere between the filaments was a uniform jelly.

The following are the generic and specific characters :

Genus *Nostochopsis.* Thallus definitus, trichomata ramosa; cellulis perdurantibus in latere sessilibus aut in ramulis brevissimis superpositis.

C. Lobata.—C. thallo viride aut luteo-viride, cavo, enormiter lobato, natante, modice magno, (ad 0·5 unc. in diametro) ; trichomatibus plerumque longis, flexuosis, viride, modo inarticulatis, partim articulatis, cylindricis aut submoniliformibus, sparse granulatis.

February 15th.

Director S. W. Mitchell, M. D., in the Chair.

Twenty-two members present.

March 1st.

Director S. W. Mitchell, M. D., in the Chair.

Twenty-six members present.

Dr. R. J. Levis exhibited two pathological specimens illustrating embolism,—*one*, an embolus, three inches long, from the external iliac artery ; the *second*, a gangrenous hand, in which the condition was induced by embolism of the brachial artery.

March 15th.

Director S. W. Mitchell, M. D., in the Chair.

Twenty-two members present.

April 5th.

Dr. Ruschenberger in the Chair.

Twenty-two members present.

Dr. J. G. Hunt remarked, that in a specimen of *Cissus* in his possession, he had recently noticed in the leaves such an exuberant growth that the parenchyma actually burst through the cuticle. That he had also noted, growing in its vicinity, a specimen of the *Cuscuta*, which soon embraced the *Cissus*, and by its parasitic rootlets planted itself upon the latter plant, in which the exhuberant growth was taking place, after which this excess of growth was gradually checked. The *Cuscuta* is a parasite which never attaches to cryptogams; a fact probably indicating some undetected difference in the sap of the flowering and the flowerless plant.

April 19th.

Director S. W. Mitchell, M. D., in the Chair.

Twenty-three members present.

Dr. J. G. Hunt presented the following:

Improved Microscopical Cement.—Dissolve old and hard Canada balsam in chloroform until it is quite fluid ; then add enough oxide of zinc ground in linseed oil to bring the mixture to the consistence of cream. If it dries too quickly on the brush to work smoothly, add a small quantity of oil of turpentine. Occasionally stir the mixture before using. This cement dries very quickly and retains a fine polish, does not become brittle, and will not run in under the thin glass cover. If proper care be used, all ordinary danger from leaking when objects are mounted in cells, can be obviated. It may be colored if desirable.

An impression prevailed with some members that this was the form of cement recommended by Dr. H. C. Bastian, in No. II of the new "Monthly Microscopical Journal," of London, a cement much used in Germany. With this cement, however, composed of solution of gum-mastic in chloroform, thickened with nitrate of bismuth, Dr. Hunt was familiar, and having used it, finds it far inferior to that made according to the formula furnished by him this evening.

Mr. Walmsley had used these cements, and accorded the superiority to that of Dr. Hunt.

May 3d.

Director S. W. **Mitchell**, M. D., in the Chair.

Twenty-six members present.

Dr. J. G. Richardson read a paper "On the detection of red and white blood corpuscles in Blood Stains," with experiments to prove that the colorless material left after the action of pure water on dried blood clot is not simply fibrous, as appears to have been hitherto supposed by Robin, Virchow, Fleming and other authorities, but chiefly an aggregation of those external portions of innumerable corpuscles, which probably correspond to and certainly constitute their cell walls.

For paper, see Am. Jour. Med. Sciences, July, 1869.

Dr. William Pepper presented a specimen of a small pedicellated cystic body, attached near the free end of the right fallopian tube. This little cyst is described by Virchow under the name of the "terminal hydatid:" it is a normal, but by no means constant structure, and is the homologue of the vesicle of Morgagni, which appears as an appendix to the head of the epididymis.

The specimen was obtained from a young woman who died from uræmia, following granular degeneration of the kidneys. She is not known ever to have presented any disturbance of menstruation.

Dr. H. C. Wood exhibited specimens of an undescribed species of *Œdogonium*, which he named *O. mirabile*, *Spirogyra Weberi* and *S. quinina*, not previously found in North America, and found by him in the vicinity of Philadelphia.

May 17th.

Vice-Director W. **Pepper**, M. D., in the Chair.

Thirty members present.

June 7th.

Director S. W. **Mitchell**, M. D., in the Chair.

Twenty members present.

The following paper was read and ordered to be published:

Sections of Hard Tissues and other Substances for the Microscope.

BY CHRISTOPHER JOHNSON, M. D.

As hard substances cannot be examined microscopically in their natural state, they must undergo preparation by the investigator before the secrets of their physical and vital condition can be mastered. The end or object of this "preparation" is the production of a lamina so thin as to be translucent, and yet sufficiently thick to retain every physical characteristic. To accomplish this desired end much patience is called for in each of the several processes especially adapted to the particular and different states of hardness, with or without brittleness, or toughness, and finally to the condition of preservation of objects, whether recent or fossil.

It must be evident to every student in microscopy, that certain qualities of objects oppose a barrier to the facile disentanglement of their web and woof, and such, for example, is the absorption of light, as totally by black or partially by colored bodies. Wherefore a knowledge of these qualities is requisite; and success will reward the operator in proportion as he adapts modes of preparation to tissues offered for examination, if he possess the amount of skill and patience indispensable in delicate manipulations.

It may be observed, before proceeding to develop any method of section making, that perfect sections, even, of some objects, such as biliary and vesical calculi, as well as certain pathological concretions, require the aid of a suitable mounting before their intimate constitution can be exhibited; so that the work of the microscopist does not always end with the production of a successful section, but must not be regarded as complete until the preparation be secured and displayed in some proper way upon a slide.

When I needed the aid of guides in directing my unskilled manipulations I was very often embarrassed by the meagreness of the assistance afforded by authors of works on practical microscopy; inexperienced readers, however, will find in my attention to detail that help which will secure me exonoration from the charge of tedious minuteness, and I beg to add that I theorize in nothing, but give the results of my own personal experience.

Hard substances may be divided into two groups, the *first* comprising all such as require the emery wheel for their reduction, and the *second*, all other and less resisting structures. Among the former are to be found the flints and siliceous petrifactions, as also very hard calcareous bodies, whether petrifactions or of recent and normal constitution, as the porcelain-like shell of many molluscs. In the *succeeding* group may be ranged recent or non-silicified teeth and bone, calculi of various kinds, brain sand and calcareous deposits, hard seed capsules, and the like. Whatever be the process employed to subdue these refractory substances, the resulting section must possess certain qualities or fulfil certain conditions. It must be perfectly flat, of suitable and equal thinness, and ought, if possible, to be polished on both sides. I say if possible, because there are many hard and tough substances which are not susceptible of a polish; and it is almost needless to add that, in the study of structure, sections cut in several directions are indispensable for its correct appreciation.

The apparatus I have employed is of very simple description. For the preparation of sections of objects of the *first class*, I necessarily have recourse to the lathe fitted with a "true" disc of thin soft steel, for emery on the side or edge, as I might wish to grind a surface or cut a slice; with an Ayrshire stone for grinding, and a wooden disc cut across the grain to bear the polishing powder, the tin powder in use by stone cutters. But to save time I have frequently availed myself of the steadily revolving fine stones in a glass-cutting establishment, which readily "cut" the chalk-flint by which they are sharpened and corrected. The lathe is a part of a former watchmaker's, and similar to those commonly in vogue with dentists. The emery

I use was sorted by eleutriation, a process indispensable before applying it to the production of an acceptable and polish-bearing surface. This method consists in shaking up good flour of emery with water in a tall cylindrical jar, suffering the whole to stand in repose for, say, two seconds. and pouring off into another jar the fluid overlying the sediment. The original deposit may again be treated in the same way, and when the water shall have been added to that first removed, the residual powder is collected, dried and labelled 2′′ emery.

The finer particles withdrawn in suspension into the second jar are shaken up afresh, allowed to deposit for three seconds, are collected, dried and labelled 3′′ emery; while the finest dust, which subsides very slowly in the decanted water, may be gathered as 5′′ or 10′′ emery, the last being fine enough for polishing.

For most purposes large portions of hard objects destined for microscopic examination are unnecessary; and besides, the grinding and other preparation of extensive slices involve a useless expenditure of time and patience. Small sections made from fragments or pieces cut off by wheel from a cabinet specimen are altogether satisfactory—indeed, chips flaked off with adroitness are oftentimes extremely useful in directing investigation, and may even bear mounting as permanent objects.

As small particles or pieces cannot be readily manipulated in their independent state, it is necessary to secure them in such manner as to insure the success of their skillful reduction. This may be done by attaching them singly by shellac or hardened balsam to pieces of heavy mirror glass of about an inch in diameter and ground smooth on the edges. Thus fastened a good surface may be obtained for one side. Then the object must be turned over and again cemented by heating the shellac as before, and pressing the prepared surface flat against the glass. Now, as the grinding progresses the qualities of the section become apparent, and the degree of thinness determined by direct inspection of the section under the microscope.

Large sections, as of shells, can be made with as much precision as smaller ones; but no one can hope to emulate the late Mr. W. Glen, of Cambridge, unless he have extraordinary skill, coupled with most extensive experience.

As to the manner of working the lathe and its wheels, I feel obliged to refrain from speaking; for nothing but repeated essays with that instrument, or personal instruction of an adept, can assist the beginner more than the bearing in mind of a few rules of universal application. *First*, produce and even, steady and not too rapid.motion of the disc; *second*, charge the wheel, whether side or edge, with a moderate quantity of emery, or diamond dust, at a time; *third*, hold the object lightly against the cutting surface; and *fourthly*, change the position of the object by rotating it upon its flat surface, and at short intervals, as the grinding progresses.

When ground and polished the specimen may be separated from the shellac and glass by immersion in hot alcohol, and mounted, either by simply fastening it with balsam to a slide, or embalming it in that substance and covering with a thin glass.

It is worthy of note that many objects which may technically be classed among the hard substances, require for their reduction the intervention of a cutting powder between themselves and the reducing surface, whether wheel or stone. As instances I may mention biliary and other calculi, the dried crystalline lens and phthisical or other calcareous concretions. No hone can smoothly cut these bodies, for its grit soon becomes smoothed out by the adherent debris, and the specimen is either not further affected or it is destroyed by breaking. The powders I employ are the fine "silex" of the dentists, and the very fine dust of pumice made even by rubbing while moistened between glass plates. A first surface should be secured by rubbing the specimen upon a hone made flat by means of emery and water and a flat marble slab, and the coarser and then the finer powder are to be employed and kept moist with water. Now the object must be dried and afterwards attached by moderately hard balsam to the slide on which it is to remain, and the final surface will be reached by a repetition of the process of grinding. And here I would call attention to some points in the manipulation, which are that in reducing any substance to the condition of a lamina, it should be poised securely with the fingers, whether it be free or cemented upon glass; propelled along the face of the hone with a long, even and steady sweep; and turned repeatedly upon its horizontal axis. A polish may be given or not, according to the nature of the substance, and the section may be regarded as finished if it bear a satisfactory examination under the microscope. And it should not be forgotten that many specimens are best prepared by working them up to the power under which they are destined to be studied.

Hardened organic substances, as the crystalline, do not bear the heat necessary for attachment to a glass slide, wherefore the second surface must be produced by fixing the first surface upon a bit of white wax by gentle pressure.

Finally, after the grinding shall have been completed, it will be necessary to clean the slide with water; and after drying, to wash away the powder and debris adherent to the surrounding film of balsam with chloroform passed lightly over the slide by the finger covered with soft linen, or, if the section will endure such treatment, the whole of the margined balsam may be cleared away by pouring over the slide a stream of chloroform. But turpentine should be used to detach a finished section from wax.

To mount such sections it will be found advantageous to moisten them with turpentine before dropping on the thin balsam. The cover glass is to be applied warm, and a small weight, as an inch or even a half inch screw placed on it as eventually to press out superfluous balsam. I say eventually, because such slides are unfit for use for several weeks.

When the balsam shall have become sufficiently tenacious the slide may be cleaned by passing a knife blade, held flat, from the cover glass into the circumvallate cement, and then boldly away over the slide. What remains is to be removed with a solution of caustic potash, which itself calls for a free watery ablution, and then the slide needs nothing but the label.

This method of mounting sections is applicable to a great variety of objects, and will be found to yield the best results in the case of urinary crystals, of the so-called hematin crystals, or of the chitinous skeletons of insects as actually practised by the incomparable Mr. T. W. Starr, of Philadelphia.

The preparation of objects of the second class is attended with difficulties, some of which are to be overcome by means similar to those employed in manipulating objects belonging to the former, and some, by reason of the nature of the objects themselves, are to be surmounted by a resort to various expedients. Thus, sections of spines of Echinodermata, as also of biliary and other calculi, may be made in the same way as sections of harder substances; that is, by grinding down a true surface by means of fine silex and finer pumice with water, fixing that side, when dry, upon a slide with Canada balsam hardened until it has become very "tacky," and then finishing the second surface in the same manner as the first. But the calculi, generally, must not be removed from the slide, although the marginal balsam may be cleaned away by drops of chloroform; and they must be covered with soft balsam in situ and so covered. The spines, however, may and must be entirely cleaned by repeated drops of chloroform, in which they are to be floated away from their early attachment; whereupon the slide being wiped clean in the middle, the section is to be floated back to the central spot, suffered to dry, then moistened with turpentine, and immediately overflowed with soft balsam. Heat may or may not be employed before applying the cover glass.

The trick of sectionizing a very small spine of Echinus, or similar object, consists in perforating a disc of a large spine, saturating it with hardened balsam, and inserting the capillary spine into the perforation, aided by heat. The two substances ought to be the same. Now grind down the large piece; and when finished and washed out, find, separate and mount the particle.

But structures such as recent teeth and bone, the hardened albumen of kernels of such nuts as that of *Phytelephas macrocarpa*, brain, sand, &c., bear heat indifferently. They crack, but more provokingly *warp*, when attempts are made to fix a first surface. Indeed, when not properly dried after the performance of the first step of the process already described, they usually warp so much as to render the making of a uniformly thin section impossible. To remedy the defect of the heat process I found a matter of much difficulty; so I employed a new one, which I claim to be easy, certain and original.

To make sections by the method I have so successfully employed but little apparatus is required. A couple of Arkansas hones, the one coarser, the other very fine, and both kept *flat* by rubbing upon a hard marble flag with flour of emery and water, are of first necessity. I also recommend that the hones while being "faced" should be pushed steadily along diagonally, first one way and then the other, so that the surface will be "set" or finished quincuntially.

In the next place I mention fine Russian isinglass for glue, to be boiled, strained, and dried in flakes upon a polished metal surface. Then thin letter paper is to be provided; several bits of thick mirror glass, for holders, ground on the edges, of different sizes, from one inch square upwards, according to the size of the projected section, as also sweet oil and a little chloroform. And finally there will be needed some alcohol, and a small quantity of eleutriated polishing putty, oxyd of tin, as used by stone cutters.

As a preliminary it is desirable that some definite idea as to the plane of the section be entertained, and this is possible for all except minute fragments. Then the saw cuts out a small block, say of one-eighth inch in thickness, or the file reduces a mass to near the desired level. Now the object is moved steadily and rather lightly along over the coarser hone, wet with water, and then over the finer one, the operator being careful to pass the object evenly beckwards and forwards, to turn it about from time to time, and to examine the surface frequently with a lens to detect invidious scratches. Teeth and similar objects should be pushed along in one direction only, the enamel forward in the case of teeth, so as to avoid and prevent separation of their different constituents.

When a perfect surface shall have been obtained let the specimen be washed in water and then immediately dropped into alcohol, which, abstracting water from every part alike, *dries* the object—so far as aqueous wetting is concerned—and no warping occurs. Next, strain a bit of chamois skin upon a block, sprinkle upon it a little of the polishing powder, moisten all with alcohol, and polish the first surface by rubbing it with gentle force upon the prepared skin. After receiving polish the specimen is to be restored to its alcoholic bath.

The succeeding step of the operation consists in melting a little of the isinglass in a silver spoon or other more convenient metallic receptacle, making a fluid of the consistence of cream, and adding, at the end, a few drops of alcohol to increase the tenacity by making the thin glue take better to the polished surface. Warm one of the glass holders very slightly, with the finger varnish one of its faces over with the glue, prepare a bit of the thin paper in like manner, and quickly cement the paper evenly upon the glass. Trim away the edges with scissors and the paper is ready for the *guides*, which are two little ribbons of paper about a quarter of an inch wide, and to be glued on the paper-facing on opposite sides and touching the margins. The thickness of the guides determines the thickness of the future section, for between them is left a gutter in which this section will lie. Now with the finger place a film of glue upon the paper between the guides; and, having previously wiped the object quickly dry, slightly moisten its surface and edges with the isinglass, apply the specimen dexterously, make forcible pressure, and confine it by wrapping it tightly with strong thread. It is to be observed that the isinglass should not exceed the area limited by the guides, nor should it much surpass the contour of the specimen, otherwise difficulty will be experienced in grinding the second surface.

In ten or twelve hours remove the binding string, and with a fine saw cut away a portion of the block of matter, or with a file rasp down the adherent piece. But here again method is everything; for a tooth, for example, must be filed from the enamel towards the ivory, otherwise separation will occur. And the same rule is to be observed in grinding down to the second surface.

In once more resorting to the hones, which, by the way of reminder, ought from time to time to be dressed afresh after the manner already pointed out, it becomes apparent that *oil* and not water should be used to moisten and clean the surface. Consequently, the second grinding is done in oil, and in perfect safety, for as that fluid exerts no influence upon the glue, the section is retained in position upon the glass throughout the process. When, at length, the desired thinness is reached, it will be perceived that the guide papers as well as the section lie equally close upon the surface of the "trued" fine hone, and that they somewhat resist the action of the stone; and the ground edge of a clean slide applied across the face of the holder will assure the equal thickness of the guide papers and the section itself. If an attempt be made to push the operation farther the holder will be found to adhere somewhat tenaciously to the hone.

The holder must now be carefully wiped clean on all sides; whereupon, after careful examination of the surface for scratches, a polish is to be given. But scratches may be ground off with caution, or suffered to remain if they do not compromise essential parts of the specimen.

With a bit of fine silk stuff borne upon the finger end, and moistened with oil, take up a little of very fine polishing putty, and rub the adhering section quickly as well as briskly, for no heat must be evolved by continued friction, otherwise portions of the specimen will rise in consequence of warping, and be broken off; or else the polish may be given by means of a small bit of chamois skin fastened upon the end of a phial cork, dampened with oil, and armed with polishing powder.

Again wipe off the holder with clean soft cambric; then with the same charged with alcohol; next wash the holder rapidly in soap and water, using the finger the while; pour clean water over section and glass, and finally deposit the holder in a glass dish filled with clean water.

Here let us pause while the water is detaching the section from the paper, and softly liberating the unbroken contour of its margin. The guides are set free, the subjacent paper quits the holder, and the section is left alone by the withdrawal of both paper and glass.

Before proceeding further I desire to show how sections of very slender rods, spicules, or teeth, such as those of the Bat, may be prepared with facility. As these minute or delicate objects cannot be held by the fingers, the expedient of glueing them to larger objects must be resorted to. But to secure equality in the grinding, the two structures, the supporting and the supported, must be the same. Thus, tooth must be attached to tooth, bone to bone, &c. And as very fragile cancellated tissue will hardly bear the friction of the hones, the meshes are to be filled up with isinglass glue, and the specimen dried before the saw or the hone can be employed. Such specimens must be ground in *oil* for the first surface; after which, when wiped off and robbed of this oil by maceration in chloroform, they may be cemented with glue upon the paper-faced holder, and the production of the second surface is accomplished after the manner already pointed out.

The support afforded to cancellated tissue by isinglass in the class of objects at present under consideration may be found equally in hardened Canada balsam for objects of another sort. The spines of some Echinoderms are so brittle as not to endure handling in their natural state, but the most ghostly of these, such as the hollow spines of *Diadema*, may be readily and safely held and subjected to the process of grinding if their cancelli be filled with hardened balsam, introduced, of course, while hot. And, to repeat, these small bodies must be cemented upon larger ones of the same kind if anything like trueism in the plane of the section be attempted or required.

Our specimen exists, but is still unfit for mounting, because it is saturated with oil and retains small particles of the putty. To rid it of the latter it may be removed to a slide by forceps, or, if too delicate, must be floated on the water by tilting the vessel, and then dipped up on a slide. A camel's hair pencil full of water readily washes away all particles of paper or dust, especially if the lamina be held upon the slide by the flattened end of a match stick; and the other surface, being made uppermost by turning in water, is to be prepared in the same way. Once more drop the section in water; then with fine forceps remove and let it fall into the alcohol; now transfer it to chloroform; and finally place it between bits of smooth bibulous paper, which again lie between a couple of clean slides. A pair of spring forceps will maintain flatness until the now finished section is required for mounting.

After so much trouble it were a pity to lose a fine specimen by bad mounting; wherefore, and to prevent a loss of time and labor and much disappointment, I beg leave to offer a few suggestions as to the manner of cageing or embalming the result of our successful efforts.

In any case choose the better side of the section as the uppermost, and this is commonly the first. Have ready, for the *dry method*, a slide cleaned with dilute alçohol, and upon it a shallow circle of shellac, applied in alcoholic solution by the aid of the Shadbolt turn-table. The shellac should be nearly hard after a day's exposure. Wipe the slide with dry cambric over the circular area, and clean a suitable cover glass which has been lying in dilute alcohol. Warm the slide over a flame of a spirit lamp to drive off moisture; suffer it to cool perfectly; place the section in the cell; warm and cool the cover; lay the latter upon the cell; on the cover put a bit of thin paper, and over this a piece of a slide, finally clamping all together by spring forceps. The slide must be held over the spirit flame until the softened shellac adheres all around the circle to the cover and the section is pressed and held flat.

When cold, the work is done.

The embalming process, like the one just described, requires a little practice to ensure success. As soft balsam pervades almost all structure, it is generally inapplicable to the mounting of tissues, such as bone and tooth. At any rate I have already spoken of the manner of its use. But where tubuli, &c., are to be made conspicuous by retained air, hardened, not hard, balsam must be employed.

To mount a section in such balsam I proceed as follows: On a slide free from crocus-flaws pour a small quantity of soft balsam, and hold the same over a spirit lamp until by vaporization the balsam shall have become tacky when cold. The process is favored by tilting the slide to and fro. Let the slide cool; and upon the end of a spatula blade prepare other balsam, but a trifle less hard. The section being laid upon the cold balsam on the slide, and this held between finger and thumb, the spatula blade is to be heated until the balsam flows; whereupon the blade is suddenly turned over and made to press the hot cement upon the section for a moment. The heat striking through fixes the section; and as the blade is withdrawn the slide must instantly be held over the lamp until all the balsam melts. And here again warpage is almost entirely prevented.

At this moment the cover-glass, made warm, is laid over the specimen, not flatly but dipping at one edge, and by pressure is made to assume its proper position. It almost always happens, however, that too much balsam is included between the cover and the slide, and that air bubbles appear in the field. To remedy these evils, I resort to a process similar to that which I employ when fastening a cover-glass upon the shellac margin of a cell. I first cut away all possible hard balsam with a hot knife-blade. Then, the slide being cold, a strip of fine paper is laid over the whole of it, and upon the paper another slide. The two plates of glass are presently to be clamped together with stout forceps, closing with a slide, and, holding by the forceps, both of the surfaces are exposed alternately to the heat of the spirit flame sufficiently to melt the whole balsam. All superfluous balsam now runs out between the principal slide and the paper, and usually bears with it the air-bubbles, so that the section remains perfectly flat, and embedded in the smallest possible quantity of balsam.

When perfectly cold the upper slide may be removed, the paper readily stripped off, and the mounting is accomplished.

To clean off the marginal hard balsam with a hot knife-blade, to clear away residual streaks or border, and to wash to brightness both surfaces of the slides with aqua ammonia on a bit of rag, occupy but a few minutes; and nothing remains to be done but attach the label duly inscribed.

There are those who prefer to ornament the edge of the cover with black varnish, which certainly gives a pretty appearance to the slide; but I would recommend the previous protection of the margin of balsam below it by a thin coat of shellac varnish, which effectually prevents penetration of the black into the balsam, whether soft or in a hardened condition.

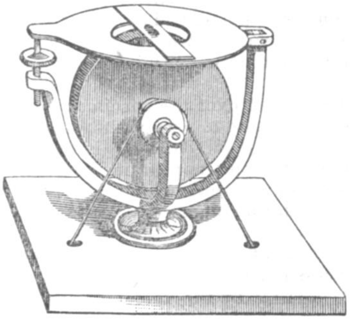
In reviewing this paper, I do not seek to excuse its prolixity, but to express the hope that the methods and processes described in it may obtain the approbation of others; and that they may continue to give the very excellent results which have rewarded my labors, as well as of those friends who have accepted my guidance in microscopical studies.

This paper was accompanied by thirty-eight preparations for exhibition, including sections of teeth, shells and calculi.

Description of Machine for Grinding Sections of Hard Substances for Microscopic Purposes.

BY COLEMAN SELLERS.

The preparation of thin sections of hard substances, such as bone, teeth, stone, &c., for microscopic purposes is usually attended with more or less trouble, and requires considerable skill on the part of the workman. The chief difficulty is in securing uniformity of thickness in the specimen. A machine lately devised by Mr. J. S. Bancroft, of Philadelphia, and in use at the establishment of Messrs. Wm. Sellers & Co., embodies a principle which, applied to this purpose, facilitates the operation. This particular machine is one of those improvements in the direction of enabling unskilled labor to take the place of skilled labor, or to enable skilled workmen to do a greater amount of good work in the same time. It is a well known fact that patient industry combined with mechanical skill will enable marvels of good workmanship to be produced, but those inventions are the most valuable which with the least outlay of capital in costly machinery enables unskilled workmen to produce the same result more expeditiously and if possible more perfect. The contrivance of Mr. Bancroft was designed to produce a truly plane surface on hardened metals. It consists of a plane metal table, the upper surface of which is made accurately true. This plane surface or plate rests on hinges at one end and is provided with an adjusting screw under the other end. In the middle of the table is an oblong rectangular slat, say one inch wide, so arranged as to allow the edge of an emery wheel placed below the table to project slightly above the surface of the plate. The emery wheel, supported in suitable bearings, is made to revolve rapidly on its axis, and its periphery becomes an abrading point in the centre of the plane surface of the metal plate. By means of the regulating screw the plate can be so adjusted as to determine the distance that the edge of wheel shall project above



the plate. In use, the hardened metal to be ground true is pressed firmly by the hands of the workman upon the plate, and passed with a sliding motion in various directions over the wheel. The emery wheel touches the highest places, and gradually reduces all to one uniform plane. With this machine straight edges of hardened steel have been produced of such perfection that when pressed together on the edges the one will lift the other by cohesion, without the intervention of a fluid.

This machine suggested to me an application of the same principle to the preparation of microscopic objects. For the large plane table with the narrow opening in the machine, as described, I substitute a small plate of brass or iron, with a circular opening in its centre of about 1¾'' diam. The emery wheel is supported on a spindle and stand, such as can be purchased at any of the dental depots, and intended for the purpose of rotating emery or corundum wheels, &c. The table hinged above the wheel has an adjusting screw to determine the height of its surface plane above the edge of the emery wheel. In use, the specimen, ground and polished on one side, is then mounted with hard balsam on the glass slide upon which it is to remain. It may then be roughly ground down or filed down to any convenient thickness short of that actually needed; then it is laid upon this grinding machine (specimen down), the slide resting on each side of the centre hole in the plate, the specimen touching the revolving emery wheel. Passing it back and forth over the wheel, it is reduced to a plane parallel with the glass upon which it is cemented, and its final thinness regulated by the adjustment of the table. When thin enough for the purpose intended it may be smoothed with a slip of Scotch stone and polished without fear of destroying the uniformity of thickness obtained by the section-grinding machine. In using the instrument in the preparation of sections of ivory or bone I have found that the grinding should be done with either a dry wheel or one moistened with oil, as water will swell the specimen and crack it loose from its cement. The wheels used by me are made of emery and glue, not the shellac corundum wheels sold at the dental depots. It is probable that a circular file, *i. e.*, a steel wheel with teeth on its edge, would do well as a grinding wheel for bones, in place of the emery wheel.

D. H. C. Wood exhibited slides of mycelium filaments and spores of a fungus, which were found disseminated throughout a crust or scab, similar to others expectorated at different times during the past six months by a gentleman, who had sent the crust to Prof. Leidy. Dr. Wood promised to investigate the subject further, but up to the present time could not speak precisely as to the specific form. The filaments resembled those found by Virchow and others in the lungs, and called by them *aspergillus pulmonum.*

June 21st.

Director S. W. Mitchell, M. D., in the Chair.

Eight members present.

Dr. W. W. Keen read a paper on the subject, "Is Atropia an Antidote to Hydrocyanic Acid?"

Dr. Mitchell desired to know whether the quantities used were at all comparable to those of Pryer.

Dr. Keen replied that this was the point most difficult to determine, but having found by experiment that two minims of the officinal hydrocyanic acid of our Pharmacopœia was a lethal dose for rabbits, he had then sought to make the quantities accord with those of Pryer.

Sept. 6th, 1869.

Director, S. W. Mitchell, M.D., in the Chair.

Nineteen members present.

The Director, for the committee appointed at last meeting on Dr. Keen's paper, reported that they had asked Dr. Keen to make some further experiments.

Dr. Keen read a supplement to his paper, in compliance with this recommendation.

Dr. Tyson read a paper entitled, "a Note on the Distribution of Nerves to the Vessels in the Connective Tissue of the Pig's Kidney." See Amer. Jour. Med. Sci., Oct., 1869.

Dr. W. Pepper exhibited some slides of muscular fibre removed, post-mortem, from an emigrant girl, who died of typhoid fever.

The patient was a German girl, æt. 22, who had been in America but six weeks. There had been six deaths from fever on board the emigrant ship in which she came to this country. She died on the nineteenth day.

Besides the ordinary lesions of the disease, the muscular tissue of both ventricles of the heart presented a marked degree of friability, and, on microscopic examination, was found to have undergone quite advanced granular degeneration, as originally observed by Zenker.

The psoas and external oblique muscles of the right side were also examined, but were found healthy.

Dr. Howell made some remarks on the application of photography to microscopy. He spoke of the inexpensiveness of the apparatus necessary to the work, and exhibited the results of his experiments with sunlight, and also the magnesium light, as applied to micro-photography. The positive prints were from photographs of sections of teeth, bone, cartilage, coal, &c.

Dr. H. Allen made some remarks upon the peculiarities in the construction of inter-orbital space of the human skull. He demonstrated by outlines upon the blackboard that these peculiarities may consist of the following plans:

(1.) Absence of nasal bones with vertical plate of ethmoid appearing between the nasal processes of the superior maxillæ.

(2.) Absence of left nasal bone, its area being occupied by the nasal process of the corresponding side.

(3.) Same as (1), with rudiments of nasal bones in position.

(4.) Ossification of inter-nasal septum.

Reference was made to Dr. Van der Hœven's paper on this subject in Siebold and Kölliker Zeitschrift.

Sept. 20th, 1869.

Vice-Director, W. Pepper, M.D., in the Chair.

Twenty-two members present.

Dr. J. G. Richardson exhibited specimens of Sarcina ventriculi found in the vomited matter of a patient.

He remarked that his observations tended to show that the divisions of the Sarcina which were formerly figured by some as having central nuclei, are now seen, under a higher power, to be divided into four parts, the junctions of their separating fissures being apparently mistaken for their nuclei.

Dr. Wm. Pepper desired to place on record the following observations:

A young man suffering with acute tuberculosis presented, for two weeks before death, mild wandering delirium, and finally became almost unconscious, with ecstatic expression and constant fumbling movements of the hands.

At the autopsy, a diffused proliferation of the cells of the perivascular sheath of the meningeal arterioles was found, though not producing at any point granulations visible to the naked eye; and in several of these vessels emboli were found impacted.

Dr. Richardson stated that in examining the blood of a dog killed by opium he had noted aggregations of white blood corpuscles floating in the blood, but thought they might have occurred post mortem.

Oct. 4th, 1869.

Director, S. W. Mitchell, M.D., in the Chair.

Twenty members present.

Dr. Mitchell read a paper by Prof. Christopher Johnson, of Baltimore, descriptive of a case of male hermaphrodism and hypospodias. See Journal of Academy,

Dr. Wm. Pepper made a verbal communication on the microscopic characters of nerve fibrils after amputation.

Oct. 18th, 1869.

Director, S. W. Mitchell, M.D., in the Chair.

Nineteen members present.

Dr. J. G. Richardson read a paper entitled "Observations and Experiments tending to prove the identity of the so-called Halford's Corpuscles with White Blood Corpuscles."

Dr. Richardson also showed some of the blood of animals poisoned by rattlesnake venom, in which the corpuscles of Halford were rendered beautifully distinct by staining with aniline, and presented all the characters of white blood corpuscles when treated by acetic acid or water.

Dr. H. C. Wood stated that he had recently been engaged in some extended observations on the effects of the recently discovered alkaloids of veratrum viride, *viridia* and *veratroidia*. With regard to the former, he had noted that when given in poisonous doses, the first change manifested by the animal poisoned, a rabbit for instance, was a disposition to be quiet,—the quietness being the result, not of any cerebral affection, but of *weakness*. After a while the animal begins to tremble, and this trembling soon becomes peculiar; so that when the hand is placed over the body of the creature, a succession of thrills are noticed to pass throughout it. Soon, the strength failing, the animal lies almost flat upon the ground. After this come convulsions, the animal screaming and running along the ground; extreme weakness being apparent in the position maintained, the belly almost dragging on the ground. Finally the debility becomes more marked, the animal lies on its back, and dies,—death taking place from asphyxia, induced by paralysis of the respiratory muscles. In no instance was there vomiting or purging. On placing the hæmodynamometer in the femoral artery; the first effect noted is a diminution of arterial pressure, and subsequently diminution of the heart's contractions, the pulse going down from 150 to 50 or 60; but the heart always continues to act after respiration ceases; death never takes place through the circulation.

After section of the pneumogastrics, the same effects follow the administration of viridia, showing that it is a direct depressor, either to the muscular structure of the heart itself or to the ganglia contained in it. No effect follows the introduction of viridia into the muscles of the thigh of the snapping turtle, while a very small quantity introduced into the muscular structure of the heart of the same creature acted promptly, showing the action to be a local one.

Veratroidia produces death in the same way, but there is no trembling; while it always vomits and sometimes purges. The action of the heart is at first markedly depressed, but this is followed by a rebound, the pulsations increasing in force and frequency. Dr. Wood considers this rebound due to an accumulation of carbonic acid in the structure of the heart, temporarily overcoming the depressing effect of veratroidia. When the pneumogastrics are cut, the usual depression of the heart's action takes place; but the Doctor has made but a single experiment, and with regard to the *rebound* this was unsatisfactory.

Nov. 2d, 1869.

Director, S. W. Mitchell, M.D., in the Chair.

Fifteen members present.

Dr. S. W. Mitchell read a paper "On the Effects of the Administration of Opium and its Alkaloids to Birds." See Am. J. Med. Sci. Jan., 1870.

Nov. 15th, 1869.

Director, S. W. Mitchell, M.D., in the Chair.

Seventeen members present.

Five microscopic slides were donated to the cabinet by Mr. W. H. Walmsley.

Dr. Jos. G. Richardson exhibited a living specimen of menobranchus. He referred to the large size of its blood corpuscles, and, as a result of their study, arrives at a conclusion at variance with that of Dr. Beale, as to the existence of a distinct cell wall about the corpuscle, since he believes that he has even seen the cell wall about the crystal resulting from a single globule of the hæmoto-crystallin.

Dr. Wood also stated to the Society that, whilst making his researches upon the alkaloids veratroidia and veratria, he had occasion to administer these alkaloids after section of the par vagum, and had been astonished to find that they never purged or vomited when the pneumogastrics had been cut. At first he had ascribed this to idiosyncrasies in the animals operated upon, but as experiment after experiment afforded the same results, it became evident that it was impossible to explain by individual peculiarities that which always happened. The doctor had extended these experiments, using as purgatives gamboge, calomel, podophyllin, extract of jalap and croton oil, and in all cases he had been unable to purge after section of the pneumogastrics.

Dr. Wood also exhibited colored drawings and mounted slides of a variety of desmids, and made the following remarks:

The slides were prepared from a collection made by Dr. F. W. Lewis in Saco Pond, a small lake of spring water in the White Mountains, not far from the Crawford House.

This very rich collection embraced the following new and old species:

Triploceras gracile, *Bailey*.
Triploceras verticillatum, *Bailey*.
Euastrum ornatum, sp. nov.
Euastrum elegans (*Bréb.*), *Ketz.*
Euastrum Ralfsii, *Rabenh.*
Euastrum multilobatum, sp. nov.
Cosmarum Brebesonii, *Menegh.*
Cosmarium commissurale, *Bréb.*
Cosmarium cucumis, *Corda.*
Cosmarium suborbiculare, sp. nov.
Staurastrum arachne, *Ralfs.*
Staurastrum paradoxicum, *Meyen.*
Staurastrum Lewisii, sp. nov.
Staurastrum munitum, sp. nov.
Closterium angustatum, *K.*
Closterium juncidum, *Ralfs.*
Closterium striolatum, *Ehr.*
Xanthidium armatum, *Bréb.*
Xanthidium, sp. ?
Micrasterias furcata, *Ag.*
Arthrodesmus quadridens, n. sp.
Penium digitus (*Ehrb.*), *Bréb.*
Bambusina Brebesonii, *Ktz.*

The doctor called attention to the fact that whilst in this neighborhood one rarely met with a desmid which was provided with large granules or spines; in this northern collection by far the majority of the specimens were so provided. Of *Cosmarium commissurale*, Bréb., Dr. W. stated he had only seen a single specimen, and this differed from the typical form in having the sinus very narrow in its outer portion, and in being shorter, but these differences did not seem enough to justify specific separation. Of *Closterium angustatum*, also, but one specimen had been found, which agreed very well with the typical forms, except that it was a little narrower, its greatest breadth not being more than 9-12000″ = ·00075″.

The desmid which the doctor referred to *Euastrum Ralfsii* he stated to differ considerably from the typical form in the proportion of the breadth and length. There are also certainly four, if not more, umbonations on the face of each half-cell. These are nowhere distinctly spoken of as existing, and Mr. Archer, in Pritchard's Infusoria, states there are none visible in the front view of *E. Ralfsii.* They are, however, represented in the side view of the original figure, and are said to be very noticeable by Mr. Archer himself, when the desmid is so looked at. In the Saco Lake specimens they are always seen in the front view with great difficulty, and in some cases I failed entirely to demonstrate them, so that they do not afford a good character for the indication of a new species.

EUASTRUM MULTILOBATUM, sp. nov.

E. magnum, fere duplo longius quam latum, medio profunde constrictum, et cum sinu modice amplo; a latere medio ventricosum et duplo biumbonatum, ad verticem dilatatum et emarginatum; semicellulis a fronte trilobatis, lobis sinus amplissimis inter se sejunctis; lobi basale distincte late emarginato, lobo centrale obtuso, lobo polare late leviter sinuato-emarginato; semicellulis a vertice quinque lobulatis; cytiodermate lævi.

Diam.—Long. 57-12000″ = ·00475″; lat 30-12000″ = ·0025.

E. large, about twice as long as broad, in the centre profoundly constricted, with the sinus moderately large; from the lateral view somewhat enlarged and doubly biumbonate in the middle; semicells from the front trilobate, the lobes separated by very wide sinuses, the basal lobe broadly emarginate, the central lobe obtuse, the end lobe broadly and shallowly sinuately emarginate; semicells from the vertex five lobed; cytioderm smooth.

Remarks.—The basal lobes of this beautiful desmid are distinctly five lobulate, the lateral lobules being longer and broader than the others, which, instead of being emarginate, are obtuse. The sinuses separating lobes and lobules are very broad, with very obtuse angles. When the desmid is viewed from two-thirds round, so as to show the anterior and posterior lobules especially, it presents an outline in which all the sinuses are of similar form, and the central and basal lobes are about equal size; whereas, when viewed from the front, the basal lobe is much the broader. When the desmid is viewed from the side it is seen to be enlarged in the centre, and provided with two distinct umbonations each side of the comparatively narrow central sinus.

EUASTRUM ORNATUM, sp. nov.

E. oblongum, diametro duplo longius, profunde constrictum, sinu angusto lineari; semicellulis a fronte trilobatis; lobis basalibus latissimis, nonnihil sinuato-emarginatis, angulis plus minus productis et rotundatis; lobo polare medio profunde lineare inciso, segmentis late rotundatis; semicellulis a latere bilobatis, lobis basalibus profunde emarginatis et cum angulis plus minus acutis; cytiodermate distincte ordinatim punctato.

Diam.—35-12000″ = ·00029.

E. oblong, twice as long as broad, profoundly constricted; semicells from the front trilobate; basal lobe very broad, slightly sinuately-emarginate, angles more or less produced and rounded; polar lobe medianly profoundly linearly incised, segments broadly rounded; semicells bilobate at the sides, basal lobes profoundly emarginate and with the angles more or less acute; cytioderme distinctly regular punctate.

Remarks.—This species is close to *E. crassum*, from which it differs in the proportionate length, being only twice instead of three times as long as broad; in the size being only three-fourths as large; and especially in the peculiar lateral splitting, as it were, of the basal lobes.

ARTHRODESMUS QUADRIDENS, sp. nov.

A. late ovali, vel suborbicularis, paulum longius quam latum, cum margine crenato-undulato; semicellulis nonnihil reniformibus, utroque fine aculeo subulato, modice robusto, acuto, recurvo, armatis; cytiodermate cum verruculis paucibus modice minutis in seriebus paucibus dispositis instructo; semicellulis a vertice acute ellipticis, et cum margine crenato et superficie sparse verruculosa.

Diam.—Lat. 3-4000″ = ·00075; long. 5-4000 = ·00125″.

Broadly oval or suborbicular, a little longer than broad, with the margin crenately undulate; semicells somewhat reniform, at each end armed with a subulate, moderately robust, acute, recurved large spine; cytioderm with a few smallish tubercles arranged in three or four rows; semicells from the vertex acutely elliptical, with the margin crenate and the surface sparsely warty.

Remarks.—This species approximates *A. divergens*, from which it differs in the arrangement of its granules, its attaining not one-half the size, and, I believe, in the larger and more robust spines.

STAURASTRUM MUNITUM, sp. nov.

S. submagnum, fere ½ plo longius quam latum, medio leviter constrictum; semicellulis a fronte enormiter hexagonis, angulis in processus rectis et divergentibus productis, dorso processibus similibus 4—5 instructo; semicellulis a fronte polygonis vel suborbicularibus, margine processibus numerosis, plerumque 9 instructo; dorso processibus 5—8 instructis; processibus omnibus similibus granulato-dentatis, apice achroo simplicibus, bifurcatis vel fissis. 25-12000″ = ·002.

Diam. a vertice cum processibus.—51-12000″ = ·00475. Sine process.

S. rather large, about one-half longer than broad, slightly constricted in the middle; semicells from the front irregularly hexagonal, the angles prolonged in straight divergent processes, and the surface furnished with four or five similar ones; semicells from the front polygonal or suborbicular, the margin furnished with numerous processes, mostly about nine, and also with 5—8 on the dorsum; processes all similar, granulate-dentate, their transparent apices simple, bifurcate or torn.

Remarks.—This species is most closely allied to *St. fuscigerum*, Bréb., from which it is at once distinguished by the orbicular vertex. The constriction between the semicells is also very different. In *St. munitum* it is a gradual, not very deep, hour-glass contraction; in *St. fuscigerum* it is very narrow and linear.

STAURASTRUM LEWISII.

S. læve, sinu amplissimo, spinulo parvo armato et cum angulo obtuso; isthmo nullo; semicellulis a fronte late triangularibus, a vertice triangularibus et cum angulis nonnihil tumidis, et rotundatis; angulis spino maximo, robusto, acuto armatis.

Diam.—Long. cum. spin. 1-400″ = ·0025; lat. cum spin. 27-12000″ = ·00225″. Sine spin.: long. 1-600 = ·001666; lat. 13-12000 = ·001666. Spin.: long. 1-1500 = ·000666.

Smooth, with a very ample sinus, which is armed with a small spine and has a very obtuse angle; isthmus absent; semicells from the front broadly triangular, from the vertex triangular, with the angles somewhat tumid and rounded; angles armed with a very large acute robust spine.

Remarks.—This desmid is most closely allied to *St. aristiferum*, Ralfs., but differs from it in outline as seen from the front, there being no mamellation of the ends. The spines in the sinuses are also wanting in the European species.

COSMARIUM SUBORBICULARE, sp. nov.

C. parvum, suborbiculare, paulo longius quam latum, cum margine enormiter crenato, vel crenato-undulato; semicellulis a latere orbicularibus, a vertice ellipticis; sinu extra angustissimo sed intra nonnihil excavato; cytiodermate crasso, sparse verruculoso; granulis in semicellulis singulis subdistantibus et in seriebus elongatis, duobus (interdum unica) externis curvatis, et in seriebus duobus internis brevibus et rectis.

Diam.—Lat. 14-12000″ = ·0012; lat. 16-12000 = ·0013.

Small, suborbicular, a very little longer than broad, with the margin irregularly crenate, or crenate undulate; semicells from the side orbicular, from the vertex elliptical; sinus very narrow, but within somewhat excavated; cytioderm thick, sparsely coarsely granulated; granules subdistant, in each cell arranged in one or two curved marginal series and in a central group of two or three short rows.

Remarks.—The arrangement of the granules in this desmid is peculiar, one or sometimes two rows of large obtuse pearly granules placed at rather wide intervals along the whole outer margins, and then in the centre of each semicell a group of two or three, or even more short straight rows of three or four similar but rather smaller granules. The isthmus is rather broad and short; sometimes it has on it one or two granules.

The doctor also exhibited drawings and specimens of the following new species:

Genus PLEUROTÆIUM.

P. BREVE.

P. robustum, diametro 4—8 plo longius, in medio distincte constrictum sed haud undulatum, utroque polo nonnihil attenuatum; apicibus truncatis et nonnihil rotundatis; cytiodermate crassissimo, dense granulato-punctato; marginibus vel rectis, vel breve undulatis.

Diam.—·0008—·00095.

Robust, 4—8 times longer than broad, distinctly constricted but not undulated in the middle, slightly attenuated towards the ends; apex truncate and somewhat rounded; cytioderm very thick, densely minutely granulate; margins either straight or shortly undulate.

Remarks.—This species was sent to me by Dr. Billings, who obtained it near Washington, D. C. The margins are sometimes straightish, but in others there are three or more distinct short undulations, or rounded projections in each half margin. The cell wall is excessively thick, especially at the end. In many cases much thicker than the drawing.

Genus TETMEMORUS.

T. GIGANTEUS, n.

T. maximus, oblongus, diametro 3 plo longior; apice haud attenuato, late rotundato; suturis profundis, linearibus; cytiodermate irregulariter granulato-punctato.

Diam.—24-7500 = ·0031.

I found this beautiful desmid in a stagnant pool in Bear Meadows, Centre Co., in the month of August. It is very different in its outline from its nearest ally, *T. granulatus.* The diameter is preserved uniform until, at the very end, where there is an alteration in the line of the margin, so as to cause some contraction. This is, however, wanting in some specimens. The ends are therefore broad and obtuse. The size is also double that of *T. granulatus.*

Dr. Mitchell exhibited a perfect egg, with shell, enclosed in a larger egg. The outer egg contained albumen and a partial yolk. The hen from which the specimen was obtained had produced several similar ones.

Dr. W. F. Norris was chosen a member of the Section.

Dec. 6th, 1869.

Director, S. W. MITCHELL, M.D., in the Chair.

Eleven members present.

Mr. Walmsley donated three preparations of the lung, liver and kidney of the rattlesnake injected.

DR. S. W. MITCHELL exhibited specimens of *hydrate of chloral* in solid, and in aqueous solution. He had administered hypodermically to a pigeon 10 grains, producing immediate death. Three grains similarly administered resulted in death at the expiration of between two and three hours; the pigeon having, however, several times apparently expired before death actually took place. To a rabbit 15 grains were administered hypodermically, death occurring in an hour. In each instance, rigor mortis supervened rapidly.

The election for officers for the ensuing year was held, which resulted as follows:

Director, S. W. Mitchell, M.D.

Vice Director, Wm. Pepper, M.D.

Recorder, Jas. Tyson, M.D.

Treasurer, C. N. Pierce, D.D.S.

Curator, W. H. Walmsley.

Publication Committee.—Recorder, *ex off.*, Chairman; F. W. Lewis, M. D.; W. Pepper, M.D.; M. W. McAllister; W. S. Bolles, M.D.; J. G. Hunt, M.D.

Curators.—W. H. Walmsley, *ex off.*, Chairman; J. G. Richardson, M.D.; T. W. Starr; F. W. Lewis, M.D.; W. F. Norris, M.D.

Auditors.—H. M. Bellows, M.D.; W. McFadden, J. W. Queen.

Dec. 20*th*, 1869.

F. W. Lewis, M.D., in the Chair.

Seventeen members present.

Dr. J. G. Richardson donated two slides of blood of the menobranchus, mounted dry.

Dr. H. C. Wood exhibited specimens of *Nostoc cristatum*, Bailey, from the Alleghany range, and also others from the Rocky Mountains. He stated that he believed this species was identical with *N. Alpinum*, of Europe, and remarked upon the three widely separated localities in which it had been found. He thought the key to the mystery was in a little plant described under the name of *N. Dickiaei*, from Northern British America, apparently identical with *N. cristatum*, and which he thought indicated a connection between the mountain localities through the cold northern regions.

Dr. J. G. Hunt called attention to some previously undescribed glands in the *Drosera rotundifolia*, and remarked—

In addition to the well-known oval glands on the leaves of this interesting plant, I have detected others presenting some features of interest and beauty. These new glands are cylindrical in shape and slightly curved, and are about one quarter of a line in length. Beautiful spiral cells occupy the central parts of the glands, and on these spirals rest the columnar cells which excrete the peculiar liquid of the plant. But these excreting cells occupy only *one* side, whereas they *entirely surround* the oval glands. I have found them only on the circumference of the leaves, on *long* filaments; they unfold, therefore, *earlier* than those of oval shape, and fade sooner.

Dr. Hunt also exhibited certain vegetable specimens mounted in carbolic acid solutions, which had kept remarkably well, and expressed his preference for these solutions in preserving vegetable tissues.

Dr. Tyson stated that in the preservation of animal tissues he had found carbolic acid the most satisfactory medium, usually in the proportion of 1 part to 50, with the addition of glycerin sufficient to bring up the sp. gr. to 1028, about that of the fluid by which tissues are bathed in health. For tube casts, a proportion of about 1 to 100 was sufficient, and care must be taken not to add too great a bulk at the beginning, lest the albumen of albuminous urine be thrown down, and the specimen thus ruined.

Dr. Wood thought that the impression held by some, that creasote possessed preservative properties 6 or 7 times as great as those of carbolic acid, lay in the fact that much of the creasote of the shops is really impure carbolic acid, containing a certain proportion of *cresylic acid*, which may possess much greater preservative property.

Dr. Lewis desired to know the experience of members with acetate of alumina.

Drs. Wood and Hunt both found a precipitation of the salt to take place in the preparations mounted in it.

Dr. Hunt said that for preserving entomological specimens, solutions of chloride of zinc were better even than carbolic acid, and also said that successful preservation of delicate specimens, of animal or vegetable nature, was at best relative, and that even the most successfully preserved tissues soon exhibited changes which distinguished them from fresh specimens, though they might little impair their beauty or utility.

Mr. Walmsly referred to some remarks he had some time ago made, with regard to the preservative properties of glycerin jelly, which he still found useful, but not so generally so as carbolic acid solution, on account of its transparency.

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